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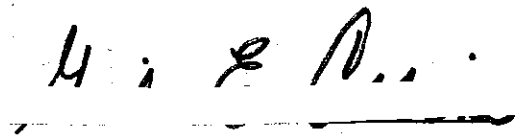

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PLANNING FOR ZOOLOGICAL PARKS IN URBAN AREAS

A THESIS

Presented to

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by

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The author dedicates this thesis to her parents, Anne G. Collins and the late Joseph J. Collins, whose continuing encouragement made this graduate study possible.

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SUMMARY

The characteristics of the modern zoological park, or zoo, reflect the increasing popularity and contributions which a zoo can provide to a community. The main types of zoos are the concentrated indoor zoo, the natural habitat zoo, and the children's zoo. However, most existing zoos have combined features of all three types. Communities of all population sizes are receiving the benefits accruing from zoological parks. According to the American Association of Zoological Parks and Aquariums, approximately 11 per cent of the public zoos in the United States are located in cities of less than 25,000 population. In addition to the recreational opportunities offered by a zoological park, educational, research, conservation, and economic goals can also be furthered.

There are available several systems for the organization and administration of zoological parks. Zoos are being governed under several types of administrative structure. The zoo director may be directly responsible to the local government or to a parks and recreation board. In some cases, zoological parks are operated under park and recreation districts. In other areas, park authorities administer the park programs of a community. In any situation, a zoological society can play an important advisory and service role. Local conditions will determine the specifics of staff size and functional organization. However, certain functions, such as administration, planning, maintenance, public services, public relations, health, and research are universally carried on within zoological parks.

A program of financial planning must identify and balance expected zoological park expenditures and sources of revenue if the zoo is to participate in an orderly expansion program. The primary sources of revenue which are used by zoos include direct appropriations and tax levies, bond issues, user fees and charges, memberships, gifts, sale of animals, concessions, and grants-in-aid. With careful financial planning, a zoo can be self-supporting.

Because zoological parks tend to serve entire communities or regions, detailed studies of park locational and space requirements are essential. These locational studies should consider the population to be served, the transportation facilities needed, the site demands, the necessary public services, and the impact of the zoo on the community.

CHAPTER I

INTRODUCTION

Long a feature of large metropolitan centers, zoos are now becoming accepted as a legitimate public undertaking in smaller cities as well. Perhaps no other single attraction draws and retains the interest of the general public as do animal collections. The appeal of zoos is not limited to a special segment of the population. Zoos attract visitors of all ages and from all walks of life.

The operation of a zoological park is a special form of public service. The modern zoo not only provides a unique and exciting form of recreational experience, but it can also add to the educational, conservation, and research programs of the community.

It is essential that sound planning precede the construction of a zoological park. The large investments, in terms of physical facilities and animals, which are made in most zoos must be protected. The zoo as well as its surrounding land uses must be guarded against adverse conditions which could result from indiscriminate and improper location.

The purpose of this thesis is to provide a planning guide to communities which desire to construct a zoological park or expand an existing zoo. Characteristics of the modern zoological park, including the various types of zoos and the contributions made by zoos, are discussed in Chapter II. Chapter III deals with the available methods for governing and organizing the operation of a zoo. Available sources of

revenue for zoological parks are analyzed in Chapter IV. The final chapter is concerned with the primary location and space requirements of a modern zoo.

Information for this thesis was obtained from a review of available literature and from interviews and correspondence with zoo officials and with other individuals and agencies, both public and private, concerned with zoological park development. Field inspections also were made of several existing zoological park sites.

CHAPTER II

CHARACTERISTICS OF ZOOLOGICAL PARKS

A zoological park, or a zoological garden as it is more commonly called in countries outside the United States, is a park-like setting for the display of living animals. Originally intended to exhibit exotic animals, zoologicals parks, or zoos, have also begun to display the more common types of domestic animals with which urban children may be unfamiliar.

In addition to exhibit areas and buildings, zoos are comprised of other facilities for the convenience of both animals and visitors. Health and research facilities for the animals are generally located on the site. Various zoological park service and administrative functions are also housed on the zoo site. Parking areas, restrooms, restaurants, first-aid stations, and information booths are some of the numerous facilities provided by zoos for visitor enjoyment and comfort.

Generally speaking, there are three main types of zoos: (1) the concentrated indoor zoo; (2) the natural habitat zoo; and (3) the children's zoo. Most zoos combine features of all three types, making the variety of park designs infinite.

Concentrated Indoor Zoo

In the past, the concentrated indoor type of zoo was the most common type in the United States. This type of zoo is usually intensely

developed and of a rather complete scope. The size of the zoo varies, but usually comprises less than 100 acres. Animals are exhibited in some type of artificial indoor enclosure.

Natural Habitat Zoo

Modern zoo design is becoming more oriented towards the natural habitat type of zoo. The natural habitat zoo displays the animals in settings similar to their own natural surroundings. Instead of cage bars, trenches and water-filled moats separate the animals from the viewing public. The extensive areas and subsequent costs required to duplicate natural wild animals surroundings have precluded the complete development of this type of zoo in many urban areas.

Some natural habitat zoos provide protected conveyances to transport the viewing public through the animal areas. Busch Gardens, a private zoo in Tampa, Florida, operates an elevated monorail system which runs throughout the zoo.

Children's Zoo

Children's zoos have become very popular in recent years. Children's zoos have been constructed both as a part of a larger traditional zoo and as a separate facility. Among the many cities which have developed this type of zoo are: Milwaukee, Wisconsin; Fresno, California; Columbus, Ohio; Atlanta, Georgia; Roanoke, Virginia; Lincoln, Nebraska; and Pittsburgh, Pennsylvania.

The children's zoo is usually planned on a relatively small site and is often intensely developed. The design may be based on a nursery

theme and may include either a wide range or a specialized collection of farm, native, or baby animals.

Children should be given an opportunity to become intimately associated with the animals. Several zoos have discovered that, by permitting children to actually touch and help feed the harmless animals, the children have learned to be more considerate of the animals at all times.

History of Zoological Parks

Zoological parks have a long history outside the United States. The earliest approach to a modern zoo was the Park of Intelligence, created by a Chinese ruler about 1150 B.C. and maintained for several hundred years thereafter. The ancient Egyptians, Assyrians, and Babylonians also kept wild animals, primarily to enhance the glory of their rulers. Large numbers of animals were imported by the Romans for combat between man and beast in the arena. In the Middle Ages, exotic animals were exchanged as presents between the rulers of states. These collections led gradually to the establishment of royal or public animal collections on a more or less permanent basis in many parts of Europe.

The great early collections of wild animals were connected for the most part with royal courts or cities in the Old World, but the New World had its counterpart. The Aztec ruler Montezuma built enormous installations for mammals, birds, reptiles, and fishes and employed specialists to care for the animals. The collection was destroyed by Cortes in 1521.

The United States was comparatively late in showing an interest in animals, other than as a source of food or sport, or to cater to idle curiosity in the exhibitions of traveling showmen. The first zoological park in the United States was opened in Philadelphia in 1859. The United States has since made up for its slow start and today has more than twice as many recognized zoos as any other country in the world.[1]

Extent and Location

Although some form of zoological park has been in existence for over 3000 years, zoos are developing more rapidly today than in any other period in their history. Presently, the growth of zoological parks in the United States is greater than in any other country in the world.

A survey of zoological parks throughout the United States reveals that communities representing a wide range of population sizes are successfully supporting zoos. The American Association of Zoological Parks and Aquarium lists over 100 zoos which are supported primarily either by local governments or by non-profit institutions, such as zoological societies.[2] Table 1 contains a classification, by population size, of the communities in which these zoos are located. An analysis of the table reveals that the largest percentage of zoos are located in cities having a population of from 100,000 to 500,000. However, a significant portion, 11 per cent, of the zoos are in cities under 25,000 population.

Many small cities are successfully operating zoos--a fact not generally recognized. A zoo can result in a vital and dynamic addition to the small community but careful planning for the small-city zoo is

Table 1. Classification by Population Size[1] of Cities with Public Zoological Parks

Less Than 25,000	25,000 to 100,000	100,000 to 500,000
Lodi, Cal.	Eureka, Cal.	Birmingham, Ala.
Merced, Cal.	Palo Alto, Cal.	Tuscos, Ariz.
Muscatine, Iowa	Santa Ana, Cal.	Little Rock, Ark.
Garden City, Kan.	Colorado Springs, Col.	Fresno, Cal.
Great Bend, Kan.	Pueblo, Conn.	Oakland, Cal.
Independence, Kan.	Middletown, Conn.	Sacramento, Cal. (1964)
Manhatten, Kan.	Wilmington, Del.	Denver, Col.
Stoneham, Mass.	West Palm Beach, Fla.	Bridgeport, Conn.
Traverse City, Mich.	Boise City, Idaho	Jacksonville, Fla.
Scottsbluff, Neb.	Bloomington, Ill.(1965)	Miami, Fla.
Mountainside, N.J.	Champaign, Ill.	Atlanta, Ga.
Abiquiu, N.M.	LaFayette, Ind.	Honolulu, Haw.
Klamath Falls, Ore.	Michigan City, Ind.	Peoria, Ill.
Murrels Inlet, S.C.	Davenport, Iowa	Evansville, Ind.
	Monroe, La.	Fort Wayne, Ind.
	Attleboro, Mass.	Indianapolis, Ind.
	Mankato, Minn. (1965)	South Bend, Ind.
	Hattiesburg, Miss.	Des Moines, Iowa
	West Orange, N.J.	Topeka, Kan.
	Asheville, N.C.	Wichita, Kan.
	Wilmington, N.C.	Louisville, Ky. (1964)
	Bismarck, N.D.	Springfield, Mass.
	Minot, N.D.	Grand Rapids, Mich.
	Eugene, Ore.	Lansing, Mich.
	Norristown, Pa.	Duluth, Minn.
	Pautucket, R.I.	Jackson, Miss.
	Greenville, S.C.	Kansas City, Mo.
	Rapid City, S.D.	Lincoln, Neb.
	Sioux Falls, S.D.	Omaha, Neb.
	Abilene, Texas	Albuquerque, N.M.
	Midland, Texas	Rochester, N.Y. (1964)
	Waco, Texas	Syracuse, N. Y.

[1]Population figures based on 1960 U.S. Census, unless indicated otherwise.

Source: American Association of Zoological Parks and Aquariums, *Zoos and Aquariums in the Americas*, ed. William Hoff (Wheeling, W. Va., 1966).

Table 1. Classification by Population Size of Cities with Public Zoological Parks (Continued)

Less Than 25,000	25,000 to 100,000	100,000 to 500,000
Salt Lake City, Utah	Everett, Wash.	Greensboro, N.C. (1966)
Norfolk, Va.	Manitowoc, Wis.	Akron, Ohio
Tacoma, Wash.	Racine, Wis.	Canton, Ohio
Madison, Wis.(1964)	Phoenix, Ariz.(1965)	Columbus, Ohio
	San Diego, Cal.	Toledo, Ohio
	San Francisco, Cal.	Oklahoma City, Okla.
	Washington, D.C.	Tulsa, Okla.
	New Orleans, La.	Portland, Ore.
	Baltimore, Md.	Erie, Pa.
	Boston, Mass.	Scranton, Pa.
	St.Paul-Minneapolis,Minn.	Providence, R.I.
	St. Louis, Mo.	Fort Worth, Tex.
	Buffalo, N.Y.	Los Angeles, Cal.
	Cincinnati, Ohio	Chicago, Ill.
	Cleveland, Ohio (1965)	Detroit, Mich.
	Pittsburgh, Pa.	New York, N.Y.
	Memphis, Tenn.	Philadelphia, Pa.
	Dallas, Tex.	
	Houston, Tex.	
	San Antonio, Tex.	
	Seattle, Wash.	
	Milwaukee, Wis.	

essential. Mr. Ri Chard, superintendent of the Sanford, Florida Zoo has stated, ". . . any city of 10,000 or more can have a very nice small zoo for an initial cost of about $20,000."[3]

The continuing popularity of zoos throughout the United States can be seen by a review of the news items concerning zoos in this country. Publications, such as the American Association of Zoological Parks and Aquariums' *Newsletter* and the *International Zoo Yearbook*

reveal that numerous new zoos are being built in communities of all sizes and that existing zoological parks are undergoing extensive expansion programs.

Contributions of Zoological Parks to the Community

Throughout the United States, communities are discovering the multitude of benefits which can be derived from a well-planned zoological park. Zoos are providing important educational services as well as exciting recreational opportunities. Research and animal conservation programs are being furthered by the unique contributions which zoos can provide. Zoological parks are also proving to be important economic assets, as many visitors to the zoo come from outside the local community.

Education

The zoological park offers an important opportunity for both formal and informal education. Elementary and secondary schools, colleges, youth organizations, and adult groups will take advantage of the facilities made available.

The zoo can operate through an informal arrangement with the local school system or a formal system can be created to develop the zoo's educational programs. In San Diego, a zoological park education committee, composed of professional school administrators and teachers, was formed to work with the San Diego Zoo officials to create a zoo education program for the local public and private schools.

A zoo's educational value depends largely on how its educational services fit into the existing educational programs of the community.

The primary means through which a zoological park can provide educational services are as follows: (1) cooperation with the local educational system; (2) direct contact with the segments of the community; (3) publications; (4) mass media; (5) informative signs at the zoo; and (6) guided tours.

Cooperation with the local education system can be accomplished in a number of ways. Many zoos conduct summer classes for both teachers and students to familiarize them with the resources available at the zoo. Certain zoo animals can be taken to the schools or films can be made showing the characteristics under discussion. Field trips to the zoo, involving guided tours by the zoo personnel, are desirable.

Direct contact by members of the zoo staff with segments of the community through lectures to community groups and by working with children's organizations is another type of educational service. A small segment of the population will be reached, but if the program is informative and well organized, the information may disseminate throughout the community.

Publications are another method of reaching the public and furthering its interest in the activities of the zoo. Included in this category are publications about the zoo, such as guide books and research papers.

Through the media of television, radio, magazines, and newspapers, interest in the zoo can be created. Several of the larger zoos participate in regularly scheduled television and radio programs. Most zoos cooperate with local news agencies to provide news coverage of interesting events at the zoo.

The informative signs at the zoo can be as important as the animals themselves. An attractive display can lose its effect if no signs or inadequate signs are present.

Guided tours can supplement the exhibit signs. Some zoos are large enough to have permanent guides as part of the zoo staff. In other zoos, mechanical reporting devices have been installed so that the individual may conduct his own guided tour. Certain other zoos work with the local board of education and a teacher is assigned to the zoo on a part-time basis to conduct tours for the children.

Many diverse educational opportunities are available to the zoo. The extent of the educational programs which may be initiated is limited only by imagination and finances.

Recreation

Perhaps no other single recreational activity appeals to all age groups, regardless of social or economic background, as does a zoo. A well-planned zoo can offer more than an animal collection. A well landscaped and designed zoological park can provide pleasant surroundings as well as a desirable setting for the display of animals.

Zoos are frequently located in conjunction with other public recreation facilities. For example, many zoos are part of a larger public park, thus providing an opportunity for a wide range of activities.

Conservation

Zoological parks are playing an increasingly important part in the conservation of wild animals, in the preservation of rare species,

and in the protection of animal health. Many animals would be extinct today if it were not for the breeding and protection encouraged by zoos. Through cooperative efforts of zoological parks, increasing numbers of rare animals are being bred in the United States. Through the means of lectures, films, and exhibitions, public awareness of the need for conservation is being increased. Zoological parks work closely with local public and private agencies concerned with animal conservation. Several of the large zoos, such as the New York Bronx Zoo, have sponsored expeditions into foreign countries to train people in conservation.

Research

Research carried on in conjunction with zoological parks has increased the knowledge and understanding of the physical and psychological needs of animals as well as of men. Many zoos engage in cooperative research with both universities and scientific institutes. Careful records are maintained on living animals in an attempt to find improved methods of animal care. In addition, the usefulness of many zoo animals does not end with their death. Internal organs are often distributed to specialists whose requirements are on file with the zoo's veterinarian.

Economic

Zoos provide important tourist attractions for communities. The tourist contributes to the economic growth of the community through purchases of food, lodging and other goods as part of a special or extended trip occasioned by the availability of a zoo.

A random survey of zoo visits or a check of automobile license

plates usually reveals that the appeal of the zoological park extends far beyond the local political boundaries. A survey of visitors conducted in 1959 by the National Zoological Park in Washington, D.C. revealed that about 20 per cent of all visitors to the zoo lived in the city, another 30 per cent lived in the suburbs, and the remaining 50 per cent of the visitors came from outside the Washington metropolitan area.[4]

New Trends in Zoological Park Design

Concepts of how animals should be presented to the public in a zoological park are constantly changing in the direction of more natural surroundings with greater liberty for the animals, and special exhibits to demonstrate the animal's normal way of life. The trend away from restraining bars began in Germany at the end of the 19th century, and the moated or barless enclosure is now commonplace.

There are numerous other innovations in the display of animals. One example is the reversal of the day-night cycle in nocturnal mammals. Small mammals seldom seen awake by zoo visitors have been induced to be active by day and to sleep at night through the use of red fluorescent light, which is invisible to the animals, during the day and white light during the night. Another plan considered to be excellent is the display of animals in groups according to their natural continent. The animals appear to be together, even if they are natural enemies, but are separated by a system of moats.

Visitor enjoyment of the zoo is enhanced through well-planned circulation patterns throughout the zoo. Forced routing of visitors is

considered undesirable. Numerous cutoffs provide for the visitor who does not wish to see all the exhibits. Zoological park design is moving toward the provision of informal patterns of spatial relationships related to the natural features of the exhibits. With the informal spacing, the visitor is led easily from one exhibit to the next.

Figure 1, a site plan of the Swope Park Zoological Gardens in Kansas City, Missouri, provides an example of the informal park design which permits the most effective use of existing topography in developing exhibits. Visitor circulation routes are separated from park service routes. The maintenance and service area, located in the northern portion of Swope Park Zoo, is served by an access road leading directly to the outside of the park. The administration building is centrally located in the zoo, providing convenient access to the visitors and park personnel.

Many innovations are occurring in building design and materials. Buildings are increasingly being designed to blend into the general park atmosphere. Building design is also placing more emphasis on the comfort and safety of the animals. New, durable materials, such as glass, aluminum, stainless steel, plastic, and tiles are increasingly being used because of their low initial and maintenance costs.

Conclusions

As urban life becomes increasingly complex and accelerated, more and more demands are being placed upon local governments for services to the public. The demands for increased park facilities have led many

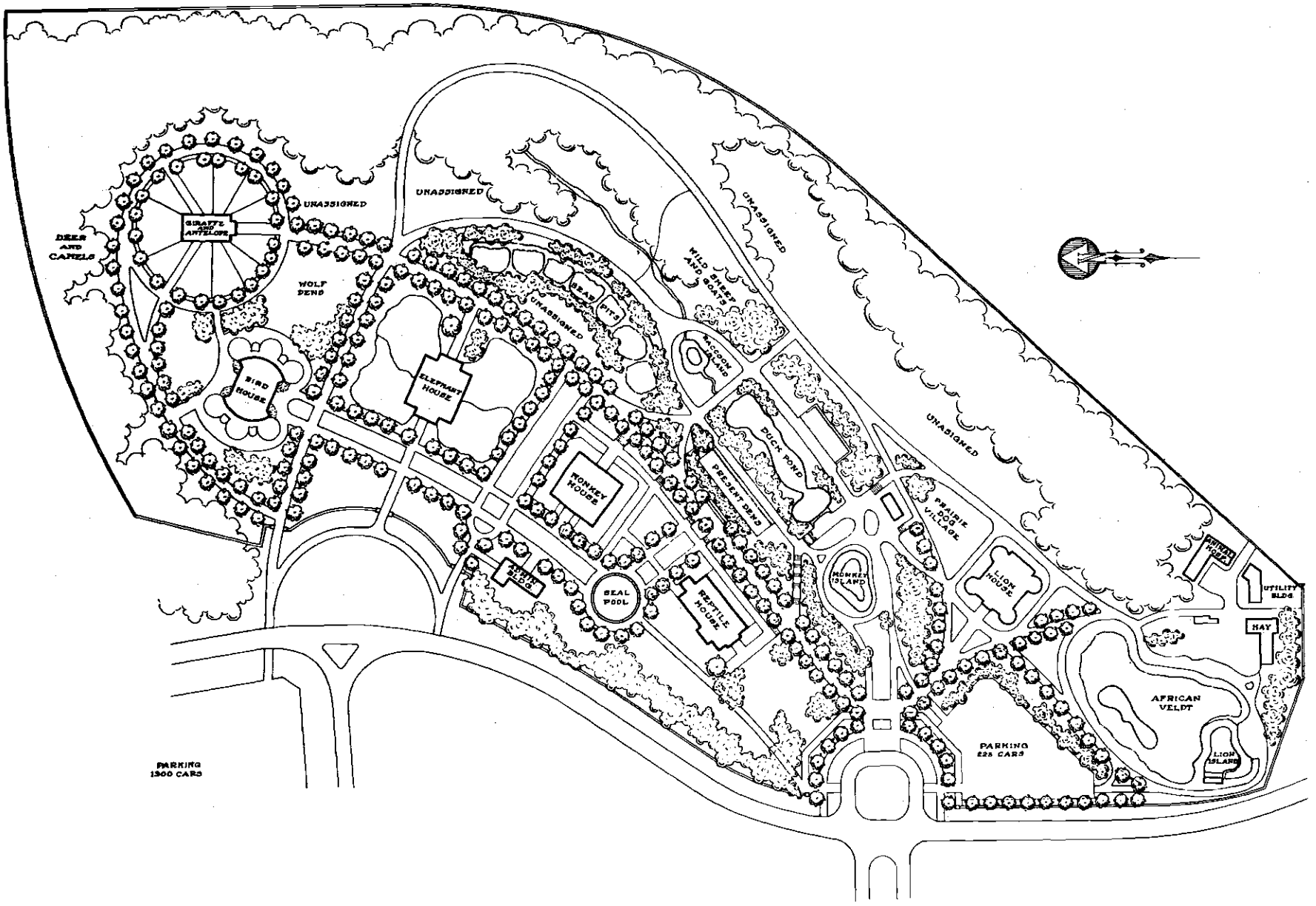

Figure 1

Swope Park Zoological Gardens, Kansas City, Missouri
Source: Michigan State University, American Institute of Park Executives, and American Association of Zoological Parks and Aquariums. A Zoological Park: Why, Where, How.

communities to investigate the benefits which accrue from zoological parks.

Local public officials should be aware of the valuable services and functions which can be performed by a well-planned zoo. To derive the maximum benefits from a zoological park, the programs and services of the zoo should be coordinated with and supplement existing local programs. Frequently, the potentials of a zoo can provide the stimulus to the creation of new services and programs in the community.

CHAPTER III

GOVERNING AND STAFF ORGANIZATION OF ZOOLOGICAL PARKS

The creation of a sound organizational and administrative framework is essential to the success of a zoological park. Local conditions will, of course, play an important part in the final determination of the most effective systems of governing and staff organization of a specific zoo.

The operations of many existing zoos have revealed that certain basic similarities exist in the operational requirements of all zoos. From these similarities, certain guidelines can be established. Figure 2 illustrates a typical organizational structure of a zoological park. The zoo director is directly responsible to the governing authority of the zoo. In turn, the various functional divisions within the zoo staff are directly responsible to the zoo director.

Governing Authority

The purpose of this section is to examine the most common systems of governmental control which have been used by communities to operate zoological parks. Zoos have operated successfully under several types of administrative structure. The zoo director may be directly responsible to the local government, or to a parks and recreation board. In some cases, zoological parks are operated under parks and recreation districts. Park authorities also administer recreation programs.

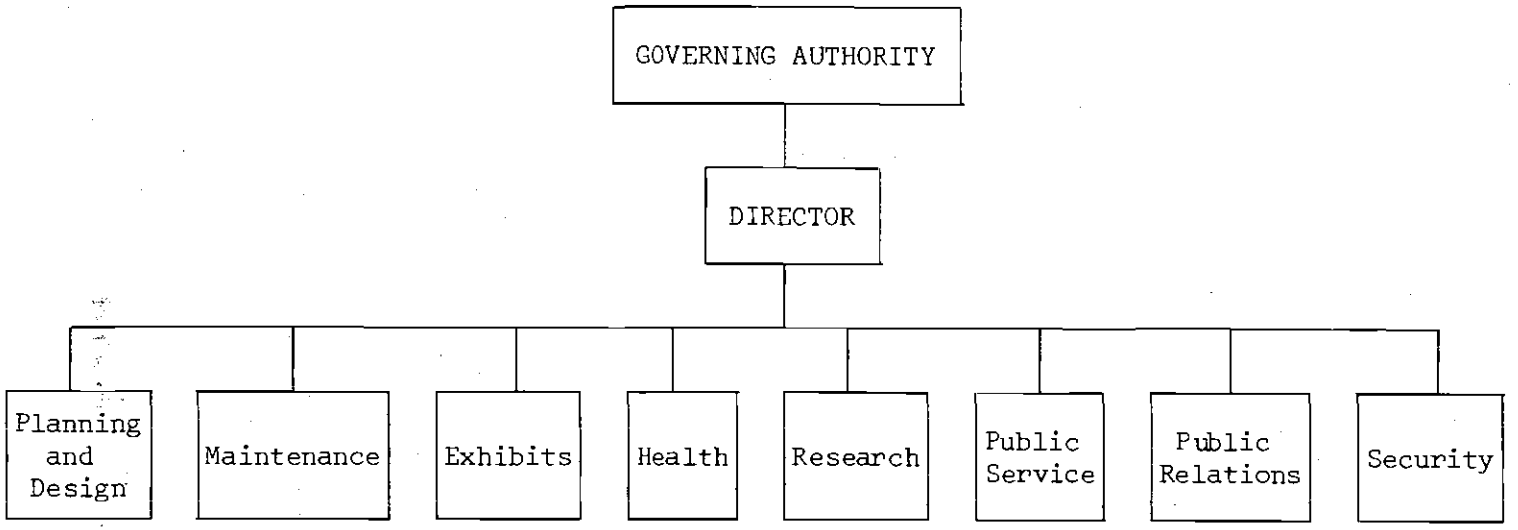

Figure 2. Typical Zoological Park Organization Chart

Under any system, a zoological society can work effectively to promote the zoo's program. Again, as was the case with zoo organization, local conditions play an important part in the determination of the most effective means of governing the local zoological park.

Direct Responsibility to Local Government

In the case of publicly-owned and operated zoos throughout the United States, many zoo directors are responsible to the city manager, mayor, or city or county commissioner. In addition, many zoo directors are responsible to the head of the department, such as the parks and recreation director, who, in turn, is responsible to a city manager, mayor, or commissioner.

There are both advantages and disadvantages to direct responsibility to the elected official. Direct responsibility to the elected official may place the zoo director in a strong position to implement his programs. However, depending upon the extent and complexity of the elected official's other duties and upon the receptivity of the official to zoological park needs, the programs of the zoo may be relegated to a position of secondary importance.

Direct responsibility of the zoo director to the head of the parks and recreation department can provide other benefits. The centralization of administration encourages full-time consideration of the recreation and park needs of the community. The economy and efficiency of the operation of the zoo can be increased through the use of a centralized department to provide maintenance and administrative services to all recreation facilities. A zoological park which operates as a

part of the over-all park system can receive the benefits of a comprehensive park and recreation planning program. In addition, public park agencies generally work closely with the local school system. Under this system, the zoological park is afforded an effective means of coordinating its educational programs with the needs of the local school system.

Parks and Recreation Boards

Parks and recreation boards have authority to administer park and recreation facilities under which the zoological park may operate. The American Association of Zoological Parks and Aquariums feels that non-political public boards are the most efficient form of administration for zoological parks.[5]

The continuity in policy making and administration afforded by non-political boards with overlapping terms for their members is of utmost importance to the zoological park. This type of board can provide for a continuity of program planning, development, and maintenance. The zoo director can plan for the orderly development and growth of the park.

Park Authorities and Districts

Since the 1930's, the creation of municipal authorities and special districts has increased steadily. Many factors have influenced the creation of these types of governing devices. Financial, jurisdictional, and administrative considerations are the primary influencing factors.

Financial reasons leading to the creation of authorities and

districts are concerned with the debt limits of local governments and with the desire to avoid tax increases. Revenue bonds issued by authorities and districts are outside the constitutional debt limits of local governments. In addition, authorities and districts may provide necessary services and still avoid tax increases by resorting to user charges.

The second primary reason behind the creation of authorities and districts involves the jurisdictional problems encountered in the provision of public services. Boundaries of a necessary service area do not always coincide with political boundaries. The creation of a separate entity can provide a specific service for the larger area.

Finally, expected administrative or managerial benefits have led to the creation of many authorities and districts. Many persons feel that the efficiency of public services is increased if the entrepreneurial functions are separated from the governmental functions. Once this separation is achieved, a more flexible operation is allowed which attracts better qualified personnel.

Experience has shown that certain disadvantages are inherent in the creation of municipal authorities and special districts. Many districts and authorities are created for a special purpose and upon fulfilling this purpose should be dissolved. Seldom, however, are the entities dissolved. Fragmentation of governmental and political responsibility within the community and urban area is furthered.

In determining whether the park and recreation activities of a community should be governed by a park authority or district, the

community should investigate several questions. Is the use of a special district or authority the most economical and efficient method of serving the community? Will the creation of these entities further political fragmentation within the community? And finally, will the existence of a park authority or district hamper the effectiveness of the local government?

Park Authorities. A municipal authority is a public corporation, organized by a municipality under enabling state legislation, to carry on a specific function outside the regular structure of government. It is a legal entity which may incur debt, own property, and has power to finance its activities by means of a user charge.

In many respects municipal authorities are similar to municipal governments. Authorities are exempt from taxation, may levy special assessments, may exercise the power of eminent domain, and are governed by boards appointed by elected officials. However, authorities deal with public services which are intended to be self-supporting. The objective of an authority is not commercial success, but to provide a commercial service at cost or less than cost.

Because of the self-supporting character of services performed by authorities, the administration of park and recreation activities by authorities is not widespread. Theoretically, however, an authority could be organized to be self supporting. Whether the authority administered the zoological park alone or administered the entire park system, the zoo director would be responsible to the governing board of the authority.

Park Districts. There are several notable similarities as well as differences between authorities and special districts. Like an authority, the special district is entrusted with the performance of governmental functions or proprietary services vested with a public interest. The district also has a governing board which is separate from that of the municipality it serves. The governing board may be popularly elected or appointed by public officials. A special district may be more restricted as to its financial and administrative policies than is an authority. However, many districts are authorized to levy property taxes or other various types of special assessments against property. Thus, the services performed by special districts do not necessarily have to be self supporting.

Of the special districts undertaking urban functions, park and recreation districts exhibited the greatest rate of growth between 1952 and 1962.[6] Park and recreation district revenues are derived largely from property taxes, although service charges and intergovernmental transfers are also sources.

There are no examples of zoological parks which form a separate district. However, a few zoological parks, such as the Chicago Zoological Park, are operated under special districts governing park and recreation facilities. In the case of the Chicago Zoo, as well as other zoos operating under park districts, the zoo director is responsible to the governing board of the district.

Zoological Societies

Zoological societies are comprised of a group of interested citizens who may either manage the zoological park or may act as an

advisory board to the zoo's governing authority. Zoological societies are generally nonprofit institutions and do not actually govern the zoo.

The majority of zoological societies which operate the zoo are governed by the local parks and recreation agency. In this type of organization, the zoo director reports to the governing board of the society which, in turn, reports to the public parks and recreation department. Some variations of this system have worked very effectively. For example, the zoo in Erie, Pennsylvania operates under a leaseback system. The zoo properties are owned by the Erie Municipal Park Authority, whose officers are the same as those of the Erie Zoological Society. The Authority leases the zoo property to the city for an annual rental of $53,000, the amount needed for debt service on the bond issue approved for zoo facilities. At the same time, the city enters into a management agreement with the Erie Zoological Society giving the Society the full responsibility for zoo operation. The Society pays for all operating expenses with the revenue that they receive from the zoo.[7]

Zoological societies often supplement the zoo's income through financial contributions or animal donations. Some societies also own the animals outright to facilitate acquisition and disposition. Zoological societies' activities are also frequently very important to the creation of public interest in and support of the local zoo.

Staff Organization and Functions

The size and organization of the staff and the functions carried on within each division of the zoo will vary with the size and complexity of the zoological park. Although the number of exhibits and size of the

animal collection will be the prime determinants, other factors enter into the determination of the optimum staff size. The place of the zoological park in the over-all public administrative structure of the community will affect the duties and functions carried on by the actual zoo staff. In addition, the hours and months which the zoo remains open will also dictate the necessary size of the staff.

The administrative functions of the zoological park are carried out primarily by the director. Several of the larger zoos also employ an assistant director or a secretary-to-the-director to handle the day-to-day administrative matters, allowing the director to concern himself more with policy implementation.

The director carries out the policies and directives of the governing body of the zoo. Within the over-all policy, the director plans, organizes, directs, inspects, and reports on all aspects of the zoo's operations. Certain office management functions, such as personnel planning, accounting, budgeting, and purchasing may be conducted within the office of the director. The director also may be in charge of fund-raising activities for park development. In smaller zoos, the director will probably become involved to varying degrees in many other aspects of the zoo operation, such as public relations and building supervision.

The success and quality of the zoo, to a large extent, relies upon the capabilities of the zoo director. Consequently, the selection of a qualified director is one of the most important steps a community must take in planning for a zoological park.

A survey conducted by the writer of the organizational structure of various zoos throughout the country revealed certain similarities in the functional divisions of the various zoological parks. The following discussion of the primary divisions and their functions is intended to serve only as a general guide to the organization of a zoological park. The requirements and resources of a local community must determine the final organization. Functional divisions of a typical organization might be set up under the zoo director as follows: (1) planning and design; (2) maintenance; (3) exhibits; (4) health; (5) research; (6) public service; (7) public relations; and (8) security.

Planning and Design

The design of zoological parks must provide for comfortable housing for the animals, maximum visitor enjoyment, and efficient and economical operation of the park. Thus, the talents of many professions, such as architecture, landscaping, zoology, planning, and engineering, must be combined and coordinated to provide a properly planned zoo.

The work carried on within the division of planning and design affects all aspects of park operation. The division is responsible for the proper phasing and timing of new construction. Members of the division must possess knowledge of all the new and improved techniques for zoo design so that the methods can be incorporated into the zoo design. Careful coordination between the director and the division of planning and design is necessary to assure a capital improvements program that is within the financial capabilities of the zoo.

Maintenance

The maintenance division is responsible for the care of the buildings, exhibits, enclosures, and grounds of the zoo. Gardening, landscaping, painting, plumbing, and electrical work are among the numerous activities of this division.

Only the very large zoological parks are able to carry out all the duties of the maintenance division with zoo personnel. Major construction or repair jobs are usually contracted out to private individuals or carried out by the service departments of other governmental agencies in the community, such as the parks department or the public works department.

Exhibits

The planning and operation of exhibits, procuring of animals, and provision of animal care are the primary functions of the exhibit division. This division is responsible for acquiring new animals for the zoo and for selling or trading surplus animals.

The animal curators and keepers are the primary personnel within the exhibits division. The animal keepers must maintain regular reports on all important information relating to animal care. These reports are submitted to the curator or director and provide reliable records for zoo management as well as assure a continuing inspection of the animals.

Health

The health division is responsible for animal care. Sick or injured animals are provided clinical or field care. New animals are quarantined and checked for possible disorders. Records are maintained to provide for improved nutritional techniques.

The veterinarian is the primary functionary in the health division. Smaller zoos frequently find it financially impossible to employ a full-time veterinarian. However, it is essential that the services of a professional veterinarian, whether on a part-time or full-time basis, are available to the zoo.

Research

Many of the larger zoos have established separate research divisions. Frequently, smaller zoos have also been able to carry on research activities acting in conjunction with a nearby scientific institution or university.

The importance of the research function to the zoological park and to the community has already been emphasized. Many zoos have made important and lasting medical contributions through the work carried on by their research staff. For example, research work conducted at the Bronx Zoo in New York led to the isolation of Holothurin, a substance now being used in cancer research.

Public Service

The public service division is charged with the operation of services which directly affect the visiting public, and thereby influence attendance and revenue. The sale of food, beverages, souvenirs, literature, rides, etc., may be carried on by the zoological park management or contracted to concessionaires. If concessionaires are to be used, the public service division must carefully control the types of merchandise, sanitary practices, services, equipment, and personnel which are employed.

Public Relations

The public relations division is charged with the formulation and implementation of the programs of zoo promotion, publicity, public relations, and education. A well organized public relations program is important to the generation of community support for a zoo.

A publication prepared by Michigan State University contains a listing of the characteristics of a good public relations program. A well-planned public relations program should be:

> Based on well defined objectives and achievements.
> Continuous, subtly repetitious, periodically evaluated and flexible.
> Planned to utilize material which inspires confidence, develops respect, and secures approval of the public.
> Designed to utilize all effective means of communication: word of mouth, newspapers, radio and television.
> Developed in such a way that every member of the park organization is aware of its value.[8]

Security

Responsibility for the safety of the animals, visitors, and physical facilities of the zoo is the charge of the security division. Police protection may be provided by special park police, by municipal or county police, or by specially-deputized zoological park personnel. The zoological park either contracts with a public or private law enforcement agency or arranges with the local public law enforcement agency to patrol the park as part of their regular duties.

All employees of the zoo should be aware of their responsibility to protect the park, but should depend upon official police to handle serious offenses.

Cooperation between park and law enforcement agencies should be

encouraged. Preparation for special events may require additional police protection or advice.

Conclusions

It is essential that the demands of the local community as well as the zoological park be evaluated in determining the most effective systems for organization within the zoo and governing of the zoo. Poorly planned staff organization can result in duplication of efforts, ineffective disposition of resources, and a failure of the zoo to reach its full potentials. The determination of the placement of the zoo in the over-all governing structure of the community will be a major factor influencing the continuing growth and success of the zoo.

CHAPTER IV

FINANCE

Sound financial planning must accompany a program for zoo development. Sources of income must be available to meet annual operating costs as well as to ensure an orderly capital improvements program. Financial planning, working within the framework of a long-range development plan, can enable zoos to meet the costs of orderly expansion programs without incurring debts beyond their financial capabilities. Franklin Park Zoo, in Boston, Massachusetts, provides an example of a public zoo which underwent extensive financial studies to determine the present and future capabilities of the zoo.[9] A 12-year projection of operating and construction costs which the Franklin Park Zoo had prepared in 1954 is included in the Appendix of this thesis.

With careful financial planning, a zoological park can be self supporting. The San Diego Zoo raises approximately 95 per cent of its annual income from admission charges, direct sales items, and other sources. The remaining 5 per cent comes from appropriations from the local government. Of the money received from the local government, over $90,000 per year is paid back for water service and the balance, plus more, is spent maintaining the 125 acres of city park land on which the zoo is located.[10]

Certain financial resources available to the zoological park are similar to those resources available to all public park facilities and

will not be discussed in detail. These methods include direct appropriations, direct tax levies, and bond issues. However, it should be noted that direct tax levies are becoming a more popular source of revenue for zoological parks. The direct tax levy provides a continuing source of income which permits long-range planning for park operatin and expansion. Direct appropriations from municipal operating revenues are generally used to meet annual operating expenses of the zoo. Bond issues are an excellent source of funds for capital improvement programs.

Several methods of financing which are not available to other public park facilities can be utilized by zoological parks. The acquisition and development of zoological parks are financed through the use of: (1) admission fees; (2) concessions; (3) sale of animals; (4) user fees and charges; (5) memberships; (6) gifts; and (7) grants-in-aid.

Admission Fees

An increasing number of zoos are adopting entrance fees or admission charges as a means of supplementing their incomes. Entrance fees are collected in many ways. Some zoos only charge adults admission, while other zoos charge both adults and children. Most zoos do not charge for very small children. Many zoos feature one or several free days during the week.

Proponents of the use of admission fees argue that a larger share of the costs of zoo operation should be borne by the actual users of the park. Proponents feel that user charges are particularly valuable in regional centers where many visitors to the zoo are from outside the local community.

On the other hand, opponents to the use of admission fees feel that the use of the fee would prevent many low-income individuals from using the facility. In reply to the argument that an admission fee is particularly justified in regional centers, opponents argue that the provision of services, such as zoological parks, is, in fact, a responsibility of a regional center.

The fact that the levying of an admission charge provides increased revenues to a zoo cannot be denied. A study prepared for the Franklin Park Zoo in Boston, Massachusetts, estimated a 20 per cent reduction in attendance if an admission charge was levied. Most of this reduction, the report stated, would be in the form of repeat visits from persons living within a short distance from the park. The report also stated that the increased returns from other paying activities resulting from the absence of an admission charge would not offset the loss of admissions from the gate. In addition, no diminution of operating costs was foreseen by elimination of an admission charge.[11] The arguments presented in the report in favor of an admission charge can be summarized as follows:

(1) A greater income will be derived.

(2) The cost of operation will fall at least in part on those who use the Zoo rather than, as at present, on the taxpayers of Boston. Since the Zoo serves a very large metropolitan area outside of Boston proper, those who use it should share the burden of its upkeep.

(3) Experience at other zoos both in the United States and Europe and at the Museum of Science, Boston, indicates that a small admission does not significantly discourage attendance.

(4) Vandalism would be reduced by an enclosing fence; in addition, experience at other zoos has shown that an admission charge can

be expected to help reduce vandalism inside the fence during visiting hours.[12]

Numerous zoological parks are already receiving the benefits deriving from an admission charge. Table 2 indicates the amount charged and income received for admission charges by several of the zoological parks which responded to the survey that was conducted for this thesis.

Table 2. Revenues Received from Admission Charges[1]

Zoological Park	Amount Received ($)	Amount Charged Per Person ($)	
		Adults	Children
Colorado Springs, Col.	175,000	1.00	.50
Fort Worth, Texas	74,000	.25	.15
Fresno, California	47,000	.25	Free
Portland, Oregon	250,000	.50	.25
Albuquerque, New Mexico	26,000	.25	.10
Birmingham, Alabama	97,900	.50	.25
Cincinnati, Ohio	410,000	.75	.25
Denver, Colorado	110,000	.50	Free
Indianapolis, Indiana	112,000	.75	.25
Oklahoma City, Oklahoma	120,000	.50	.25
Philadelphia, Pennsylvania	463,000	.75	.25

[1]During fiscal year 1966.

Concessions

The sale of food and other items also provides an excellent source of income for zoological parks. In most cases, the zoo will

receive more benefits by operating the sales itself rather than through concessionaires. The American Institute of Park Executives and American Association of Zoological Parks and Aquariums recommend direct park operation of sales.

> It is strongly recommended that the zoological park management handle sales of refreshments, novelties, guidebooks, and animal food. In some cases it may be desirable to have a concessionaire operate under a lease agreement. However, direct park operation should be exhaustively explored before this method is adopted.[13]

It has been estimated that over-the-counter refreshment stands outsell vending machines two-to-one, and outprofit them by three-to-one.[14] These figures alone make an over-the-counter installation very desirable in zoos, which are high traffic areas.

In planning for the operation of concession stands, the zoo administrator should select a few items of wide appeal and good profit margin. Keeping the menu and operation simple offers several advantages, in addition to the obvious financial savings. More people can be served in a given length of time and the operation can be handled by more inexperienced personnel, such as high school students.

Sale of Animals

The sale or exchange of animals is a source of income utilized by the majority of zoos. Animal births at the zoo provide the zoo with an opportunity to enlarge and diversify its own exhibits through the sale or exchange or surplus animals. Sale of animals are made to animal dealers and other zoos. Frequently, the zoo can save money by dealing directly with other zoological parks rather than dealing through an animal dealer.

User Fees and Charges

Additional significant sources of income are available to the zoo in the form of user fees and charges. Parking fees, public restroom fees, rides, rental of equipment, and film sales have provided important supplementary income to zoological parks.

In some cases, zoos which do not levy admission charges have a parking fee. In other cases, both parking and admission charges are made. A study of the sources of income available to the Franklin Park Zoo in Boston, Massachusetts, recommended a parking fee to be levied during the six months comprising the peak attendance period of the zoo. It was estimated that a gross annual income of $52,650 could be expected from parking fees. It was further recommended that free parking be made available during the off-season of the zoo in an effort to encourage more attendance.[15]

The same report prepared for the Franklin Park Zoo recommended a charge for restroom facilities. Despite the fact that the report recommended that 20 per cent of the facilities be free of charge, it was estimated that approximately 80 per cent of the women and 15 per cent of the men could be expected to use the coin-operated facilities.[16]

Several of the larger zoos have elaborate facilities for the filming of television shows and movies. The money received from the television rights and sales of the films often comprises a significant portion of the zoos' budgets. However, the smaller zoos should also consider this source of income. The zoological park could undertake the filming itself or could enter into contract with private interests. The

filming of the animals can provide a public relations as well as financial service for the zoo.

Other sources of income should be explored by the zoo. These sources include: the operation of rides, such as animal rides or miniature railroads; the renting of baby strollers, wheelchairs, and conveyances for children; trained animal shows, and the operation of a zoo minibus service.

Memberships

Zoological societies which actually operate zoological parks may be empowered through their enabling legislation to sell memberships. Generally, the memberships are offered to the general public, and the income received from the sale of memberships is available for use without restriction.

Generally, several categories of memberships are created. The San Diego Zoological Society offers memberships ranging from $8 per year for a single individual to $10,000 for a benefactor.[17]

In 1966, the New York Zoological Society had over 6,000 members. That same year, the Society received approximately $121,000 from payment of annual dues.[18]

Gifts

Gifts or donations can be very important factors in the development of a zoological park. Although these sources may not occur regularly, they may present opportunities to develop certain phases of the zoo's programs which could not be provided for in other ways.

Land for the park may be provided partially or entirely through donation. Over 1/4 of all the park land in the Dallas, Texas metropolitan park system was acquired by gifts and endowments.[19]

Expansion of the animal collection frequently occurs through donations. A substantial number of zoos, including the Lincoln Park Zoo in Chicago and the Sanford, Florida Zoo, developed as a direct result of the donation of animals to the local government.

In addition to undesignated financial donations, many individuals or groups prefer to donate to specific projects of the zoo. The construction of a children's zoo in Lincoln, Nebraska was largely accomplished through local donations for specific projects.[20]

Grants-in-Aid

Various grants-in-aid are available from both federal and state agencies to assist financing recreation facilities in urban areas. These grants can become significant contributions to the financial planning for a zoological park.

Federal Grants-in-Aid

The Federal Government has various programs providing grants-in-aid for urban recreation facilities. The programs which have proved of most value to recreation planning are the Urban Planning Assistance Program and the Open Space Land and Urban Beautification and Improvement Program, both administered by the Department of Housing and Urban Development. The primary authority for the grants administered under the Urban Planning Assistance Program comes from Section 701 of the Housing Act of 1954, as amended. The Open Space Land and Urban Beautification

and Improvement Program is authorized under Title VII of the Housing Act of 1961, as amended. Grants are made available to assist urban recreation programs in: (1) planning, and (2) land acquisition and development.

Planning. Section 701 of the Housing Act of 1954 authorizes financial assistance for the preparation of comprehensive development plans for a community. Plans for community recreation areas may be included as part of the comprehensive plan. Cities and other municipalities with less than 50,000 population, and counties are eligible to receive grants of up to two-thirds of the cost of the work through their state planning agencies. Official metropolitan and regional planning agencies and metropolitan organizations of public officials are also eligible for grants of up to two-thirds of the cost of the work. In addition, cities and counties in redevelopment areas and localities in which there has occurred a substantial decline in employment as the result of a decline in government employment or purchases are eligible for grants of up to three-fourths of the cost of the work.[21]

Land Acquisition and Development. Title VII of the Housing Act of 1961 as amended by Title IX of the Housing and Urban Development Act of 1965 authorizes federal funds to assist communities in acquiring and developing land for open space uses and in carrying out urban beautification programs. Federal grants of up to 50 per cent of the cost of acquiring and developing open space land or permanent interests therein are available. Where necessary to provide open space in built-up urban areas, grants can cover up to 50 per cent of the cost of acquiring and clearing developed land. A grant for urban beautification can be up to

50 per cent of the expenditures for urban beautification. Grants of up to 90 per cent are authorized to carry out projects of special value for demonstrating new and improved methods and materials for urban beautification.[22]

State and local public bodies, established by state or local law or by interstate compact or agreement, are eligible for the grants. The applicant must have the authority to acquire title or other permanent interests in open space land. In addition, the applicant must be able to provide the local portion of the cost and be able to contract with the federal government to receive and expend federal and other funds.

Approval of an application for an Open Space Land and Urban Beautification and Improvement grant requires that the assistance be needed for the carrying out of a unified or officially coordinated program for the provision and development of open space land as part of the comprehensively planned development of the urban area.[23]

Grants covering the cost of development may include the installation of walkways, signs, fountains, shelters, small restroom facilities, lighting, landscaping, and installation of certain recreation facilities. The grant does not cover the cost of major construction projects, such as exhibit buildings, maintenance or administration buildings, restaurant facilities, or administrative expenses, such as closing costs.

The zoological park at Cincinnati, Ohio received a grant under the Open Space Land and Urban Beautification and Improvement program. Expansion area was acquired and used primarily for increased parking

areas. The grant also covered the costs of necessary landscaping, walkways, fountains, lighting and irrigation. The Madison, Wisconsin zoo has also received an open space grant to assist in the Zoo's expansion program.

State Grants-in-Aid

Several states already have grants-in-aid programs to assist local communities in acquiring land for open space uses. New York, New Jersey, Wisconsin, Connecticut, Florida, Ohio, and Pennsylvania, are among the states which presently provide this type of financial assistance to local communities.

Pennsylvania's Project 70 open space program provides for a $70,000,000 open space acquisition program to be financed by a state bond issue. $40,000,000 is provided for regional parks and reservoirs. $20,000,000 has been designated for matching grants to regional, county, or municipal authorities for local park, recreational and open space purposes. Finally, $10,000,000 has been designated for important fish, wildlife, and boating areas threatened by impending private development.[24]

In New York the voters approved two state bond issues totaling $100,000,000 for the acquisition of open land for state parks, conservation purposes and grants-in-aid to municipalities. Grants-in-aid of up to 75 per cent of the acquisition costs of parks and open spaces, with local governments providing the remaining 25 per cent, were authorized. The two bond issues allocated $50,000,000 for local park acquisition. Title to lands acquired remains with the local government.[25]

New Jersey's Green Acres Program, enacted in 1961, provided for a state bond issue for acquisition of land for recreation or conservation purposes. $20,000,000 was allocated for grants to local governments of up to 50 per cent of the land acquisition costs.[26]

Conclusions

Poor financial planning has played an important part in the failure of many zoos to meet the growing demands placed upon them by the local community. Lack of sufficient financing has retarded the growth and development of many zoos and, in some cases, has resulted in a deterioration of existing facilities.

The means are available whereby a zoological park can be financially self supporting. However, many communities are not aware of the existing potentials.

A determination and analysis of the financial resources available to zoological parks can be carried out by the local planning agency working in cooperation with local officials concerned with park financing.

CHAPTER V

PLANNING FOR THE LOCATION OF ZOOLOGICAL PARKS

The determination of a suitable site for a zoological park is important to the eventual success of the zoo as well as to the general welfare of the community. The zoo and its surrounding land uses must be guarded against adverse conditions which could result from indiscriminate and improper location.

The selection process of a site for the zoo should follow three main steps. First, an inventory should be made of available sites which have potential for use as a zoological park. The second step involves conducting a series of local studies to evaluate the potential sites in terms of the requirements of the zoological park. Finally, an evaluation should be made of the sites under consideration, and the most appropriate site selected for zoological park use.

The purpose of this chapter is to discuss the problems of locating a zoological park and to formulate a series of studies which will be useful to the community in selecting the zoo site. Locational and site analyses should consider: (1) the population served; (2) transportation facilities; (3) site requirements; (4) public services; and (6) the impact of the zoo on the community.

Population

Population studies should be concerned with the area and population to be served by the zoological park. These studies should determine where the majority of potential visitors to the zoo live.

Many of the larger zoos in the United States receive visitors daily from all parts of the world. This extensive appeal of zoological parks is not confined to the larger zoos. Many smaller cities have discovered that, based upon the large service area created by a zoo, they can successfully support a zoological park.

In most cases, the zoological park will serve at least the entire urban area. However, the most intense use of the zoo is likely to come from the middle income groups that reside in the built-up and well-populated areas of the city rather than from either the lower or upper income groups.[27] In addition, the zoo will probably be used more by the population groups in the central portion of the city than by the residents of the suburbs. This imbalance in use results in part from the greater availability of recreation resources in the suburbs.

Despite the desirability of a central location, in terms of service population, few new zoos in the United States have been able to locate in such a central area. The large open areas needed for the zoological park, accompanied by the high land costs and built-up areas characterizing the central sections of the city, generally make it infeasible to locate the zoo in the central portion of the city.

Transportation

Transportation studies should investigate the transportation facilities which will be necessary to accommodate the visitors to the zoo. The effect of the zoo traffic upon existing streets and public transportation systems should also be examined. It is important that the over-all community transportation plans be considered in selecting the site. Future transportation routes must be considered. All too often, as occurred at the Overton Park Zoo in Memphis, park land is acquired for public transportation purposes.

A location which has a satisfactory public transportation system and adequate parking spaces at the zoo can resolve the problem of locating the zoological park outside the central portion of the city.

Convenient public transportation to the zoo site is very desirable. Reasonable and frequent daily service from all parts of the locality is optimum. Intensified service on weekends as well as more frequent service on summer holidays will help encourage attendance to the zoo.

Satisfactory highway accessibility is necessary from all parts of the community. Access by local roads should be distributed over several routes to avoid bottlenecks and excessive disruption of local traffic. Accessibility to an expressway, preferably connecting with other regional highways, not only helps to defray the cost to local citizens because of added attendance but also enhances the tourist value of the city as a whole by serving as a community focal interest.

The amount of traffic generated by the zoo will depend upon such

factors as the size and attractiveness of the park, the size of the community, the availability of public transportation, and the accessibility of the park location. A zoological park will usually generate more traffic than most other forms of park recreation. Thus, transportation planning must seek to provide good accessibility to the park without creating traffic congestion or disrupting residential areas.

Site Requirements

A study of the site requirements for zoological parks should consider the site size, topography, and soil condition demands.

Size

A zoological park must provide adequate room for displays and for future expansion. The site should also provide ample space for parking areas, a scenic buffer, supplementary facilities, and circulation room for visitors and the park's operational activities.

The optimum park size for a specific zoo will be based upon several factors. The type of collection and method of display are primary factors. The trend in modern zoos toward the natural habitat type of display indicates that larger site areas, from 100 to 175 acres, will be required for sizable animal collections. The availability of land at a reasonable price also will limit the size of the zoo. Of course, the zoo will ultimately be limited by the source and amount of funds available for construction and maintenance.

Land area requirements determined by a national survey of zoological parks conducted by Michigan State University, the American Institute of Park Executives, and the American Association of Zoological

Parks and Aquariums indicated a desirable minimum of 75 acres and a practical maximum of 200 acres for a zoological park.[28] Children's zoos can be developed on considerably smaller sites. The Children's zoo in Essex County, New Jersey occupies 15 acres. Lincoln, Nebraska has successfully developed a small children's zoo on a four and one-half acre site near the center of the city.

Off-street parking should be provided near the zoo or on the zoo grounds. It is difficult to anticipate the peak number of visitors on one day because this appears not to be directly correlated with the size of the zoo or the city population, but more with the attractiveness and desirability of the zoo itself. In a development plan prepared for the Don Valley Park lands in Toronto, Canada, the following assumptions were made in determining the number of acres needed for zoo parking. It was assumed that three-fourths of the visitors would come by car, with an average of three persons per car. Each space would turn over twice per day. Including land for landscaping, 350 square feet of parking space was provided for each car. During the peak season, the average daily attendance would equal one-third the attendance of the busiest day.[29] Many existing zoological parks are experiencing a shortage of parking space. Table 3, indicating the results of a survey of 23 zoos conducted by the American Society of Planning Officials, shows the discrepancy between the number of off-street parking spaces available and the total number of spaces needed.[30]

In addition to the exhibit buildings and the buildings housing the administration and maintenance activities of the zoo, other

facilities for the convenience of animals and visitors may be located in the park. These facilities may include hospital and laboratory services for the animals, and benches, restrooms, drinking fountains, snackstands, restaurants, telephones, and information booths for the visitors. A larger zoo may contain research facilities. A greenhouse and a first aid station are other supplementary facilities which may be located in the park.

Plans for the zoological park should include consideration of the proper spacing and location for the supplementary facilities. Facilities to serve visitors should be conveniently located and easily reached throughout the park. The service area should be centrally located with an access road leading directly to the outside of the park. Pedestrian circulation paths should be separated from park service routes.

Topography

A naturally varied topography, gently rolling with some rock outcroppings, is ideal for the outdoor display of animals. This type of terrain is not only more attractive but can also be more economical. Most zoos, particularly those built with the natural habitat displays, require extensive landscaping. Where the land is not naturally rocky, costly artificial rockwork may be required. Large trees, wooded areas, and a variety of plant life are also desirable. Surface water, such as streams, springs, lakes, and rivers, is an asset to any zoo site and is almost universally simulated if it does not occur naturally. Steep slopes should be avoided for display areas, because constant use, by animals or visitors, will create erosion problems.

Table 3. Number of Off-Street Parking Spaces at Selected Zoological Parks

Zoological Park	Attendance (000 omit.)		Number of Off-Street Parking Spaces		
	Annual	Peak	Present	Needed	Total
1,000,000 and More					
Chicago (Brookfield)	1700	65	6200	None	6200
Detroit (Royal Oak)	2000	55	1400	1500	2900
Pittsburgh	N.A.	40	2 Lots	"More needed" Number n.a.	
Chicago (Lincoln Park)	4000	115	N.A.	"More needed" Number n.a.	
Washington, D.C.	3500	85	1400	2000	3400
New York (Bronx Zoo)	2500	83	1740	1740	3840
Philadelphia	684	N.A.	590	3500	4090
St. Louis	2500	45	800	800	1600
500,000 to 1,000,000					
Denver	1000	N.A.	150	500	650
Columbus, Ohio	650	21	1700	800	250
Boston	500	10	400	Several hundred	600-800
Dallas	1500	60	400	600	1000
Memphis	1000	20	1200-1500	500	1700-2000
San Diego	1500	19	2000	2000	4000
Seattle	1500	30	700	"More needed" Number n.a.	
100,000 to 500,000					
Calgary, Alberta, Canada	500	N.A.	1000	250	1250
Salt Lake City	250	10	400-500	200-300	600-800
Albuquerque, New Mexico	110	N.A.	None	None	-
Rochester, New York	450	13	400	400	800
25,000 and Less					
Hermosa, South Dakota (Custer State Park)	400	7	100	N.A.	-
Moose Jaw, Saskatchewan, Canada	70	4	None	None	-
Minot, North Dakota	386	34	5500	None	5500
Manhattan, Kansas	50	5	150	None	150

Source: American Society of Planning Officials, Information Report No. 88, *Zoos and Aquariums* (Chicago, July, 1956), pp. 20-22.

Soil Conditions

Certain soil conditions are undesirable for zoological park construction. Soil and water table conditions should be studied to avoid peat, sand, swamps, and other undesirable soil conditions.

Good natural drainage is important. Surface water should have a rapid runoff, without soil erosion. Subsurface drainage and control of the ground water table may be important problems where deep dry moats are planned.

Public Services

The zoological park must be served by water, sewers, streets, refuse collection, and other public services. Prior to the selection of a site, the zoological park and the community should arrange for the provision and maintenance of these services. Public services studies should consider what facilities are available and what additional facilities will be needed to serve the zoo.

It is desirable that city water mains and storm and sanitary sewer lines of sufficient capacity be available at the zoo site. Large quantities of water are used by zoos for drinking, cleaning of animal quarters, and water-animal tanks. Depending upon the size of the zoo, some 200 to 400 million gallons of water may be used annually.

Many zoos have found it more desirable to dig their own wells. It may be more economical to use a well because of the large quantities of water needed. Some zoo directors feel that well water is preferable for the animals because it is generally a constant temperature and because certain species of animals are sensitive to the purifying

chemicals in public water supplies. If well water is to be used, the effect on local water tables should be estimated by an expert.

Vast quantities of sewage are also produced by zoos. Even water which is used in cleaning animal areas and which might normally be drained into storm sewers is frequently required by health regulations to be connected to sanitary sewers.

Many zoos provide their own incinerators on the park grounds. The Federal Government requires the wastes and dead bodies of certain animals to be destroyed on the zoo grounds. These federal requirements will be further discussed later in this chapter.

The Impact of the Zoological Park on the Community

Studies of the impact of the zoological park on the community should consider the impact of the zoo on the surrounding land use as well as the effect of adjacent land uses on the 200, and the health and safety problems related to zoological park. Careful planning can assure that the zoo becomes an asset to the entire community.

Land Use

A zoo should not be a nuisance to the surrounding land uses, nor should the adjacent uses create an unpleasant environment for the zoo. Complaints about zoo noises and smells are rarely made when a buffer strip lies between the animal displays and other non-recreational uses. Land values are seldom affected, higher or lower, by the location of a zoo nearby.

A survey of national zoological parks conducted by the Indianapolis Zoological Society and the Indianapolis Junior Chamber of Commerce

revealed that, of those cities replying to the questionnaire, there were no complaints of odors reported to any zoo. All the cities also reported that the zoo had no effect on adjoining land values. It was pointed out, however, that it would be wise to provide a buffer zone around the park.[31]

Certain land uses are incompatible with a zoo. Certain industrial and commercial uses which create excessive amounts of noise, dust, or fumes can adversely affected animal well being as well as visitor enjoyment.

The incorporation of a zoo into a larger park facility is extremely desirable. Related recreational uses, additional attractions, and multiple use possibilities are more easily developed. Possible conflicts with surrounding residential areas could also be minimized by the use of the park as a buffer zone.

Health and Safety

The United States Department of Agriculture regulates the importation and care of wild ruminants and wild swine imported from countries where foot-and-mouth disease or rinderpest exists. To be eligible to receive these types of mammals which include such animals as giraffes, camels, and antelopes, a zoological park must be approved by the United States Department of Agriculture. Approval is based upon the physical facilities for the isolation of these "controlled" animals from domestic animals and the general public, provision for disposition of wastes and dead ruminants and swine within the zoological park, and the drainage systems in the park. The Department makes inspections of approved zoos

at least twice yearly. The Department of Agriculture also regulates the transfer and methods of movement of controlled animals from one zoological park to another.[32]

Local regulations concerning the health and safety aspects of zoological park operation are rather limited. Most communities have some type of special provisions in their health ordinances for the disposal of sewage from zoological parks. However, local safety regulations pertaining to zoos are virtually nonexistent.

At present there are no national standards for the construction of zoological parks in relation to health and safety aspects. However, due to increasing pressures from professionals in the field, it is likely that one of the national professional zoological organizations will prepare such a set of standards at some time in the future.

Site Selection

Recommendations as to which sites are best suited to the needs of the zoological park and the over-all plans for community development should result from the information obtained by the various studies. The final site selection should be based upon the recommendations made in the local studies.

Conclusions

The site selection process for the zoological park should be conducted as part of the over-all community planning program. The studies for site selection can best be carried out by the local planning agency working in cooperation with the local authorities concerned with site selection.

The proper location of a zoo can add to the enjoyment and growth of the community. Poor locational practices may result in a zoo which cannot meet the public demands placed upon it and acts as a detriment to the community.

APPENDIX

Twelve-Year Construction Cost Program

	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Parking Area - Pt. I	$ 31,600	$	$	$	$	$	$	$	$	$	$	$
Fencing	31,000											
New Entrance Gate and Walk, Rose Garden	3,000											
Ticket Booths and Police Office	13,000											
Sea Lion Pool	48,000											
Children's Zoo	37,500											
Farm Building - Pt. I	24,000											
Miniature Railroad	46,000											
Penguin Pool	20,000											
Raccoon Pit	12,500											
Flying Cage	3,000											
Waterfowl Pool	5,000											
Public Toilets (North End)		75,000										
Restaurant		76,600										
Monkey Island and Court		95,600										
Otter Pool		20,000										
Farm Buildings - Pt. II		24,000										
Parking Area - Pt. II			28,500									
Bird House			75,000									
Service Group			196,000									
Picnic Tables and Benches			4,000									
Sitting Benches (50%)			3,000									
Farm Buildings (Completed)			48,000									
Lion House				231,200								
Antelope House				142,500								
Public Toilets (South End)				70,000								
Money House					495,000	282,800						
Small Mammal House						12,500						
Pheasant Runs						5,000						
Mynah Birds						101,500						
Elephant House							400,000					
Reptile House							80,000					
Question Box and Tower								165,000				
Giraffe House								28,500				
Parking Area - Pt. III									40,000			
Vulture House									70,000			
Fox and Wolf Dens										62,000		
Waterfowl Lagoon										60,000		
Underpass										3,000		
Sitting Benches (Completed)												
Parking Area - Pt. IV (Completed)										28,500	167,220	
Improvement to Range												150,000
Bear Dens												
Outdoor Amphitheater	Future Development											
Water Supply	13,500	2,040	2,040	6,020	6,360	1,020	2,550	7,200	1,700	850	1,720	
Sanitary Sewer	3,000	8,000	8,000	1,800	2,500	6,800	2,200	3,200	2,200	1,400	900	
Storm Sewer	8,000	3,000	3,000	6,800	2,500	6,800	2,200	3,200	2,200	1,400	900	
Grounds	20,000	20,000	20,000	20,000	20,000	20,000	20,000	25,000	25,000	30,000	30,000	45,000
Bird and Animal Exhibits	600	3,800	1,200		2,500	19,500	13,000	20,000	18,700	1,200		
	$319,700	$328,040	$388,740	$478,320	$528,860	$455,920	$519,950	$252,100	$159,800	$188,350	$200,740	$195,000

From *Franklin Park Zoo--A Plan for the Future*, Boston Park District, 1954.

TOTAL...$4,015,520

Twelve-Year Operating Cost Estimate
Based on Twelve-Year Construction Cost Program

Item	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Carried Over from Previous Year	$205,000	$205,000	$269,350	$286,550	$311,550	$331,600	$363,700	$393,500	$436,270	$450,710	$459,310	$464,660	$464,660
Parking Area - Pt. I		5,000											
Fencing													
New Entrance and Walk to Rose Garden													
Ticket Booths and Police Office		8,400											
Sea Lion Pool		4,000											
Children's Zoo		21,700											
Farm Buildings - Pt. I		5,000											
Miniature Railroad		15,500											
Penguin Pool		2,750											
Raccoon Pit		2,000											
Public Toilets (North End)			3,750										
Restaurant			*										
Monkey Island and Court			8,200										
Otter Pool			2,750										
Farm Buildings - Pt. II			2,500										
Parking Area - Pt. II													
Bird House et al.				5,700									
Service Group				16,800									
Farm Buildings (Completed)				2,500									
Lion House					10,200								
Antelope House					6,100								
Public Toilets (South End)					3,750								
Monkey House						32,100							
Small Mammal House							23,500						
Pheasant Runs							1,300						
Mynah Birds							500						
Elephant House							4,500						
Reptile House								35,270					
Question Box and Tower								7,500					
Giraffe House									14,400				
Parking Area - Pt. III													
Vulture House										3,100			
Fox and Wolf Dens										5,500			
Water Fowl Lagoon											2,750		
Underpass											100		
Parking Area - Pt. IV (Completed)											2,500		
Improvement to Range													
Bear Dens													
Outdoor Amphitheater													
	$205,000	$269,350	$286,550	$311,550	$331,600	$363,700	$393,500	$436,270	$450,710	$459,310	$464,660	$464,660	$464,660

*Concession.

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